

Amendments to the Claims

The listing of claims below will replace all prior versions and listings of claims in the present application.

Claim Listing

1 1. (Cancelled)

1 2. (Cancelled)

1 3. (Currently Amended) A method for servicing transmit traffic in a node of a
 2 network, the network including a plurality of nodes connected by first and second rings
 3 formed by two or more transmission media, the method comprising:
 4 receiving usage data from a downstream node, the usage data including transit
 5 delay data associated with a plurality of downstream nodes;
 6 receiving a packet for routing to the network;
 7 determining a shortest path to a destination node including identifying one of the
 8 first and second rings as being associated with the shortest path;
 9 in response to identifying one of the first and second rings as being associated
 10 with the shortest path to the destination node, determining if the identified
 11 one of the first and second rings is more congested than the other of the
 12 first and second rings using the transit delay data;
 13 if so, routing the packet to the destination on the other ring irrespective of the
 14 shortest path determination;
 15 determining transit delay data for the node;
 16 appending the transit delay data for the node to the received transit delay data
 17 including:
 18 ~~The method of claim 2, wherein the step of appending transit delay data~~
 19 ~~includes:~~
 20 identifying transit delay data associated with a node farthest away from
 21 the node; and

22 dropping the transit delay data associated with the node farthest away
 23 from the node prior to appending the node's transit delay data; and
 24 forwarding the transit delay data including appended transit delay data to an
 25 upstream node.

1 4. (Cancelled)

1 5. (Currently Amended) A method for servicing transmit traffic in a node of a
 2 network, the network including a plurality of nodes connected by first and second rings
 3 formed by two or more transmission media, the method comprising:
 4 receiving usage data from a downstream node, the usage data including transit
 5 delay data associated with a plurality of downstream nodes, wherein the
 6 transit delay data received is of the form of a plurality of vectors each
 7 reflecting the transit delay for their respective node, and wherein the ~~The~~
 8 ~~method of claim 4, wherein the step of receiving~~ usage data includes
 9 receiving transit delay data from 32 downstream nodes;
 10 receiving a packet for routing to the network;
 11 determining a shortest path to a destination node including identifying one of the
 12 first and second rings as being associated with the shortest path;
 13 in response to identifying one of the first and second rings as being associated
 14 with the shortest path to the destination node, determining if the identified
 15 one of the first and second rings is more congested than the other of the
 16 first and second rings using the transit delay data; and
 17 if so, routing the packet to the destination on the other ring irrespective of the
 18 shortest path determination.

1 6. (Cancelled)

1 7. (Currently Amended) A method for servicing transmit traffic in a node of a
2 network, the network including a plurality of nodes connected by first and second rings
3 formed by two or more transmission media, the method comprising:
4 receiving usage data from a downstream node, the usage data including transit
5 delay data associated with a plurality of downstream nodes;
6 receiving a packet for routing to the network;
7 determining a shortest path to a destination node including identifying one of the
8 first and second rings as being associated with the shortest path;
9 ~~The method of claim 1, further comprising~~ determining an average transit delay
10 for each the plurality of nodes, the average transit delay computed as the
11 average of a previously determined average transit delay for a given node
12 and newly received delay data associated with the given node;
13 in response to identifying one of the first and second rings as being associated
14 with the shortest path to the destination node, determining if the identified
15 one of the first and second rings is more congested than the other of the
16 first and second rings using the transit delay data; and
17 if so, routing the packet to the destination on the other ring irrespective of the
18 shortest path determination.

1 8. (Currently Amended) A method for servicing transmit traffic in a node of a
2 network, the network including a plurality of nodes connected by first and second rings
3 formed by two or more transmission media, the method comprising:
4 receiving usage data from a downstream node, the usage data including transit
5 delay data associated with a plurality of downstream nodes;
6 receiving a packet for routing to the network;
7 determining a shortest path to a destination node including identifying one of the
8 first and second rings as being associated with the shortest path;
9 determining a latency metric, the latency metric indicative of a delay between the
10 node and the destination node;

11 in response to identifying one of the first and second rings as being associated
 12 with the shortest path to the destination node, determining if the identified
 13 one of the first and second rings is more congested than the other of the
 14 first and second rings using the transit delay data and comparing the
 15 latency metrics associated with the destination node for each ring; and
 16 if so, routing the packet to the destination on the other ring irrespective of the
 17 shortest path determination; The method of claim 6 wherein the latency
 18 metric is computed as the mathematical average of a previously calculated
 19 latency metric indicative of a delay for nodes between the node and the
 20 given one of the plurality of downstream nodes and a newly calculated
 21 latency metric for a same path based on the received transit delay data.

1 9. (Original) The method of claim 7 wherein the step of determining if the
 2 identified one of the first and second rings is more congested than the other of the first
 3 and second rings includes using the average transit delay data computed for each of the
 4 plurality of downstream nodes.

1 10. (Currently Amended) ~~The method of claim 1 further comprising~~ A method
 2 for servicing transmit traffic in a node of a network, the network including a plurality of
 3 nodes connected by first and second rings formed by two or more transmission media, the
 4 method comprising:
 5 receiving usage data from a downstream node, the usage data including transit
 6 delay data associated with a plurality of downstream nodes;
 7 receiving a packet for routing to the network;
 8 determining a shortest path to a destination node including identifying one of the
 9 first and second rings as being associated with the shortest path;
 10 in response to identifying one of the first and second rings as being associated
 11 with the shortest path to the destination node, determining if the identified
 12 one of the first and second rings is more congested than the other of the
 13 first and second rings using the transit delay data;

14 if so, routing the packet to the destination on the other ring irrespective of the
 15 shortest path determination;
 16 recognizing when a packet may be part of a flow;
 17 storing flow information for a flow when a routing decision is made that routes a
 18 packet in a direction that is not consistent with the shortest path, the flow
 19 information including a flow direction selected and a timer;
 20 receiving another packet that is part of the flow;
 21 determining if a timeout period has expired since a last packet in the flow was
 22 sent based on the timer;
 23 if the timeout period has not expired , then routing the another packet to the
 24 destination based on the flow information including in a direction
 25 determined by the flow direction; and
 26 updating the timer to reflect a start of a new timeout period.

1 11. (Original) The method of claim 10 further comprising setting the timer to an
 2 initial value that is the greater of the latency period between the node and the destination
 3 node on both rings.

1 12. (Original) The method of claim 11 wherein the step of updating the timer
 2 includes setting the timer to a new value that is the greater of a current latency period
 3 between the node and the destination node on both rings.

1 13. (Currently Amended) A method for servicing transmit traffic in a node of a
 2 network, the network including a plurality of nodes connected by first and second rings
 3 formed by two or more transmission media, the method comprising:
 4 receiving usage data from a downstream node, the usage data including transit
 5 delay data associated with a plurality of downstream nodes;
 6 receiving a packet for routing to the network;
 7 determining a shortest path to a destination node including identifying one of the
 8 first and second rings as being associated with the shortest path;
 9 in response to identifying one of the first and second rings as being associated
 10 with the shortest path to the destination node, determining if the identified

11 one of the first and second rings is more congested than the other of the
 12 first and second rings using the transit delay data;
 13 if so, routing the packet to the destination on the other ring irrespective of the
 14 shortest path determination; and
 15 ~~The method of claim 1 further comprising~~ determining if the destination node is
 16 farther away from the node than a predefined number of hops, and if so,
 17 routing the packet to the destination node based on the shortest path.

1 14. (Original) The method of claim 13 wherein the predefined number of hops is
 2 32.

1 15. (Original) The method of claim 13 wherein a check is made to determine if a
 2 break has been detected in the network on one of the first and second rings, and if so,
 3 routing the packet to the destination node based on the shortest path.

1 16. (Cancelled)

1 17. (Currently Amended) A method for servicing transmit traffic in a node of a
 2 network, the network including a plurality of nodes connected by first and second rings
 3 formed by two or more transmission media, the method comprising:
 4 receiving usage data from a downstream node, the usage data including transit
 5 delay data associated with a plurality of downstream nodes;
 6 receiving a packet for routing to the network;
 7 determining a shortest path to a destination node including identifying one of the
 8 first and second rings as being associated with the shortest path;
 9 ~~The method of claim 6 further comprising~~ calculating ~~the~~ a latency metric as the
 10 mathematical average of a previously calculated latency metric and an
 11 average transit delay for all nodes between the node and the given
 12 destination node.
 13 storing in a table of destination nodes a hop count reflecting a hop count between
 14 the node and the given destination node for each of the first and second
 15 rings, the latency metric reflecting the congestion between the node and

the given destination node for each of the first and second ring, a static ring selection based on the hop count, and a dynamic ring selection based on the latency metrics reflective of the congestion in the first and second rings between the node and the given destination node;

in response to identifying one of the first and second rings as being associated with the shortest path to the destination node, determining if the identified one of the first and second rings is more congested than the other of the first and second rings using the transit delay data; and
if so, routing the packet to the destination on the other ring irrespective of the shortest path determination.

18. (Original) The method of claim 17 wherein the average transit delay is weighted based on the number of hops between the node and the given destination node.

19. (Currently Amended) The method of claim 17 wherein the transit delay data is a measure of the amount of traffic in a low priority queue of a given downstream node.

20. (Cancelled)

21. (Cancelled)

22. (Currently Amended) A node in a network including a plurality of nodes connected by first and second rings formed by two or more transmission media, the node comprising:

fairness logic configured to

receive usage data from a downstream node including transit delay data

associated with a plurality of downstream nodes;

receive a packet from a host associated with the node for routing to the network;

determine a shortest path to a destination node including identifying one of the

first and second rings as being associated with the shortest path;

in response to identifying one of the first and second rings as being associated

with the shortest path to the destination node, determine if the identified

12 one of the first and second rings is more congested than the other of the
13 first and second rings using the transit delay data; and
14 if so, routing the packet to the destination on the other ring irrespective of the
15 shortest path determination; and
16 fairness logic configured to track flows associated with a node including
17 remembering a last ring on which packets of the flow were forwarded to
18 the node and setting a timer to a value reflective of a longest amount of
19 time a packet will take to reach the node on either ring, receive a packet
20 that is part of a flow and route the packet to the node using the last ring if
21 the timer is unexpired.